

## REMARKS

In the Office Action, the Examiner objected to Figures. The Examiner also kept the provisional rejection of claims 1, 4, 16, and 19 on the ground of nonstatutory obviousness-type double patenting in abeyance. These claims were rejected as being unpatentable over claims 1, 2, 5, 6, 8, 9, 12, and 13 of copending Application No. 10/716,316. The Examiner has also requested that the cross-reference to certain copending application to be added to the Specification. The Examiner has also objected to claims 29-36 for certain informalities. The Examiner also rejected claims 1-4, 14-19, 29-32, and 34-35 under 35 U.S.C. §102 (b) as being anticipated by U.S. Patent No. 6,160,846 to Chiang et al. ("Chiang"). The Examiner also rejected claim 5 under §102 (b) as being anticipated by U.S. Patent No. 6,167,085 to Saunders et al. ("Saunders"). The Examiner also rejected claims 5-10, 12-13, 20-25, 27-28, 33, and 36 under 35 U.S.C. §103(a) as being unpatentable over Chiang in view of Saunders. The Examiner also rejected claims 11 and 26 under 35 U.S.C. §103(a) as being unpatentable over Chiang in view of Saunders, and in further view of U.S. Patent No. 7,079,581 to Noh et al. ("Noh").

In this Amendment, Applicants have amended claims 31-36. Applicants have not added or canceled any claims. Accordingly, claims 1-36 will be pending after entry of this Amendment.

### **I. Objections to Drawings**

In the Office Action, the Examiner required that either Figure 1 be designated as prior art or the Application be amended to remove a reference to Figure 1 that states the digital video recorder labeled 100 is well known in the art. *See*, page 3 of the Office Action. Applicants respectfully submit that although the system of Figure 1 is known in the art, it is a high level diagram of a system in which some embodiments of the invention can be implemented.

Accordingly, Applicants have amended the Specification to recite that Figure 1 illustrates a high level block diagram of a typical digital video encoder 100 with which some embodiments

of the invention are implemented. Applicants have also amended the “Brief Description of the Diagrams” section of the Specification for a similar amendment. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objections to the drawings.

## **II. Objections to Priority**

5           In the Office Action, the Examiner has requested that either the Specification be amended or an application data sheet be submitted to include a cross-reference to co-pending applications 10/427,669, 10/427,843, and 10/716,316. Applicants respectfully submit that the cited 37 CFR 1.78(a)(2)(i) only makes it mandatory to amend an application to include a reference to each prior application to which the application claims benefit: “any nonprovisional application ...  
10   claiming the benefit of one or more prior-filed copending application ... must contain or be amended to contain a reference to each such prior-filed application ...”. [Emphasis added]. In contrast, the same section does not make the inclusion of a cross-reference to other related applications mandatory: “[c]ross references to other related applications may be made when appropriate”. [Emphasis added].

15           Furthermore, Applicants’ attorneys typically incorporate a cross reference to related application section in an application to identify applications that are filed on the same day and/or have the same or similar specification. Accordingly, in this Amendment Applicants have amended the specification to insert a “cross reference to related applications” section to identify U.S. Application 10/716,316 as a related application.

20           As the Examiner has acknowledged, an IDS identifying the co-pending applications was filed on August 3, 2007. If the Examiner requires, Applicants will resubmit 10/427,669 and 10/427,843 applications in another 1449 form and label them as commonly owned applications instead of related applications. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the objections to priority.

### III. Double Patenting Claim Rejections

In the Office Action, the Examiner has agreed that the provisional double patenting rejections of claims 1, 4, 16, and 19 be held in abeyance until allowable subject matter is indicated.

### 5 IV. Objection to Claims 31-36

In the Office Action, the Examiner objected to claims 31-36 because of the following informalities: the word “of” should be inserted between the words “one” and “an”. In this Amendment, Applicants have amended claims 31-36 and have inserted the word “of” between the words “one” and “an”. Applicants respectfully request reconsideration and withdrawal and  
10 objected to claims 31-36.

### V. Claims 1-4 and 32

In the Office Action, the Examiner rejected claims 1-4 and 32 under §102(b) as being anticipated by Chiang. Claims 2-4 and 32 are directly or indirectly dependent on claim 1.

Claim 1 recites a method of quantizing digital video information. The method determines  
15 a buffer occupancy accumulator as a difference between an actual amount of bits used and a requested amount of bits. The method also limits an amount of change in the buffer occupancy accumulator based upon frame properties. The method also encodes the digital video information by using a quantizer value that is computed based on the buffer occupancy accumulator.

Applicants initially note that the Office Action characterizes Chiang’s rate control module  
20 to correspond with the claimed buffer occupancy accumulator. *See*, page 5 of the Office Action. Applicants respectfully submit that the buffer occupancy accumulator in claim 1 is defined as a difference between an actual amount of bits used and a requested amount of bits which is not the same as a rate controller module which is well known in the art.

Applicants respectfully submit that Chiang does not anticipate claim 1 for at least the

following reasons. *First*, Chiang does not disclose, teach, or even suggest a method of quantizing that determines a buffer occupancy accumulator as a difference between an actual amount of bits used and a requested amount of bits and limits an amount of change in the buffer occupancy accumulator. The Office Action cites Figure 4 of Chiang and states that in step 415, a buffer fullness measure  $R_i$  is calculated. The Office Action then states that this buffer fullness measure is specially set so that the buffer does not underflow or overflow thus limiting change in buffer fullness. *See*, page 5 of the Office Action. Applicants respectfully submit that even if the Examiner's characterization of Chiang is correct, Chiang still does not disclose, teach, or even suggest limiting an amount of change in the buffer occupancy accumulator itself. Instead, according to the Office Action,  $R_i$  (instead of being limited to change itself) is used to limit the changes in the buffer 190. This is in contrast to claim 1 which defines the buffer occupancy accumulator and then limits the changes to the buffer occupancy accumulator itself.

*Second*, Chiang does not disclose, teach, or even suggest a method of quantizing that limits an amount of change in the buffer occupancy accumulator based upon frame properties. The Office Action states that since  $R_i$  depends on the size of the picture in bits, and picture size is considered an inherent characteristic or trait of the picture, picture size is considered a property of the picture. *See*, page 6 of the Office Action. Applicants respectfully submit that Chiang does not disclose, teach, or suggest limiting a buffer occupancy accumulator based upon frame properties. If the assertions made in the Office Action are valid that  $R_i$  is a buffer fullness measure, then  $R_i$  is disclosed to be proportional to some number of bits but not limited based upon frame properties.

In view of the foregoing remarks, Applicants respectfully submit that Chiang does not render claim 1 unpatentable. As claims 2-4 and 32 are dependent on claim 1, Applicants respectfully submit that claims 2-4 and 32 are patentable over Chiang for at least the reasons that

were discussed above for claim 1. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejections of claims 1-4 and 32.

## **VII. Claims 5-13 and 33**

In the Office Action, the Examiner rejected claim 5 under §102(b) as being anticipated by  
5 Saunders. The also Examiner rejected claims 5-10, 12-13, and 33 under §103(a) as being unpatentable over Chiang in view of Saunders. The Examiner also rejected claim 11 under §103(a) as being unpatentable over Chiang in view of Saunders and in further view of Noh. Claims 6-13 and 33 are directly or indirectly dependent on claim 5.

Claim 5 recites a method of quantizing digital video information. The method determines  
10 a base quantizer value. The method determines a quantizer adjustment based upon frame properties. The method encodes the digital video information based on a quantizer value that is computed as a sum of the base quantizer value and the quantizer adjustment.

### **A. Rejection of claim 5 under §102(b)**

Applicants respectfully submit that Saunders does not anticipate claim 5 for at least the  
15 following reasons. Saunders does not disclose, teach, or even suggest a method of quantizing digital video information that (1) determines a base quantizer value, (2) determines a quantizer adjustment based upon frame properties, and (3) computes a quantizer value as a sum of the base quantizer value and the quantizer adjustment.

The Office Action cites column 5, lines 16-35 of Saunders for determining a base  
20 quantizer value. The Office Action then cites column 5, lines 45-50 and several other lines of Saunders for determining a quantizer adjustment based on frame properties. Finally, the Office Action cites column 5, lines 56-59 of Saunders for encoding digital video information based on a quantizer value computed as a sum of the base quantizer value and the quantizer adjustment. *See*, page 13 of the Office Action.

Applicants respectfully disagree with the Examiner's characterization of Saunders for at least the following reasons. Saunders discloses that DCT coefficients are quantized according to the selected quantization level which the Office Action cites as the base quantization level and not according to the sum of a base quantization level and a quantizer adjustment based on frame properties.

Specifically, Saunders in the cited column 5, lines 30-33 discloses that a quantization base value is selected at one of ten base values by bit allocator 170. This is what the Office Action has cited as a base quantization value. Saunders further discloses that the "further DCT unit" 180 calculates DCT coefficients. *See*, column 5, lines 42-44 of Saunders. Saunders then in the cited column 5, lines 56-59 discloses that the selected quantization level (which is cited in the Office Action as the base quantization value), and the DCT blocks from the "further DCT encoder" 180 are supplied to a quantizer where they are quantized according the selected quantization level. Accordingly, Saunders discloses quantizing according to the base value itself and not the sum of the base quantization value and a quantizer adjustment based on frame properties.

In view of the foregoing remarks, Applicants respectfully submit that Saunders does not render claim 5 unpatentable. As claims 6-13 and 33 dependent on claim 5, Applicants respectfully submit that claims 6-13 and 33 are patentable over Saunders for at least the reasons that were discussed above for claim 5.

**B. Rejection of claim 5 under §103(a)**

Applicants respectfully submit that Saunders, Chiang, or their combination do not disclose, teach, or even suggest a method of quantizing digital video information that (1) determines a base quantizer value, (2) determines a quantizer adjustment based upon frame properties, and (3) computes a quantizer value as a sum of the base quantizer value and the

quantizer adjustment.

In the Office Action, the Examiner agrees that Chiang does disclose encoding digital video using a quantizer value calculated as the sum of a base quantizer value and quantizer adjustment. *See*, page 14 of the Office Action. Applicants respectfully submit that for the reasons  
5 discussed in Section VII.A above, Saunders also does not disclose encoding digital video using a quantizer value calculated as the sum of a base quantizer value and quantizer adjustment.

In view of the foregoing remarks, Applicants respectfully submit that Chiang, Saunders, or their combination does not render claim 5 unpatentable. As claims 6-13 and 33 are dependent on claim 5, Applicants respectfully submit that claims 6-13 and 33 are patentable over Saunders  
10 and Chiang for at least the reasons that were discussed above for claim 5. Accordingly, Applications respectfully request reconsideration and withdrawal and §102(b) and §103(a) rejections of claims 5-13 and 33.

### **VIII. Claims 14-15 and 34**

In the Office Action, the Examiner rejected claims 14-15 and 34 under §102 (b) as being  
15 anticipated by Chiang. Claims 15 and 34 are dependent on claim 14.

Claim 14 recites a method of determining a quantizer for quantizing digital video information. The method determines a delta value that includes a difference between a number of bits actually used and a number of bits that should have been used. The number of bits that should have been used is dependent on a frame type. The method quantizes the digital video  
20 information using a quantizer value computed based on the delta value.

Applicants respectfully submit that Chiang does not anticipate claim 14 for at least the following reasons. Chiang does not disclose, teach, or even suggest a method of determining a quantizer that determines a delta value that includes a difference between a number of bits actually used and a number of bits that should have been used where the number of bits that

should have been used is dependent on a frame type. The Office Action cites Figure 4 of Chiang and states that  $R_0 + R_{i-1}$  is a number of bits actually used, and  $T*(i-1)/N_{MB}$  is “a number of bits that should have been used”. *See*, page 12 of the Office Action. Applicants respectfully disagree with the Examiner’s characterization of Chiang. Specifically, in reference to the formula cited in the Office Action, Chiang discloses that Figure 4 is a flowchart for a method that uses the actual data resulting from the encoding process. Applicants respectfully submit that the specific text of the disclosure of Chiang does not support the Examiner’s interpretation of the cited paragraphs.

In view of the foregoing remarks, Applicants respectfully submit that Chiang does not render claim 14 unpatentable. As claims 15 and 34 dependent on claim 14, Applicants respectfully submit that claims 15 and 34 are patentable over Chiang for at least the reasons that were discussed above for claim 14. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejections of claims 14-15 and 34.

#### **IX. Claims 16-19 and 35**

In the Office Action, the Examiner rejected claims 16-19 and 35 under §102 (b) as being anticipated by Chiang. Claims 17-19 and 35 are directly or indirectly dependent on claim 16.

Claim 16 recites a computer readable medium that stores a computer program that is executable by at least one processor. The computer program includes sets of instructions for determining a buffer occupancy accumulator as a difference between an actual amount of bits used and a requested amount of bits. The computer program also includes sets of instructions for limiting an amount of change in the buffer occupancy accumulator based upon frame properties. The computer program also includes sets of instructions for encoding the digital video information by using a quantizer value that is computed based on the buffer occupancy accumulator.



In the Office Action, the Examiner has stated that claim 16 is a software embodiment of the invention. *See*, page 12 of the Office Action. Applicants assume that the Examiner has rejected claim 16 using the same grounds of rejection as claim 1. Accordingly, Applicants respectfully submit that claim 16 is patentable over Chiang for the same reasons as claim 1.

5 Specifically, Applicants respectfully submit that Chiang does not anticipate claim 16 for at least the following reasons. *First*, Chiang does not disclose, teach, or even suggest a computer program for quantizing digital information that determines a buffer occupancy accumulator as a difference between an actual amount of bits used and a requested amount of bits and limits an amount of change in the buffer occupancy accumulator. *Second*, Chiang does not disclose, teach,  
10 or even suggest a computer program for quantizing that limits an amount of change in the buffer occupancy accumulator based upon frame properties.

In view of the foregoing remarks, Applicants respectfully submit that Chiang does not render claim 16 unpatentable. As claims 17-19 and 35 are dependent on claim 16, Applicants respectfully submit that claims 17-19 and 35 are patentable over Chiang for at least the reasons  
15 that were discussed above for claim 16. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejections of claims 16-19 and 35.

**X. Claims 20-28 and 36**

In the Office Action, the Examiner rejected claims 20-25, 27-28, and 36 under §103 (a) as being unpatentable over Chiang in view of Saunders. The Examiner also rejected claim 26 under  
20 §103(a) as being unpatentable over Chiang in view of Saunders and in further view of Noh. Claims 21-28 and 36 are directly or indirectly dependent on claim 20.

Claim 20 recites a computer readable medium that stores a computer program that is executable by at least one processor. The computer program can implement a video encoder. The computer program includes sets of instructions for determining a base quantizer value. The

computer program also includes sets of instructions for determining a quantizer adjustment based upon frame properties. The computer program also includes sets of instructions for encoding the digital video information based on a quantizer value computed as a sum of the base quantizer value and the quantizer adjustment.

5           In the Office Action, the Examiner has stated that claim 20 is a software embodiment of the invention. *See*, page 12 of the Office Action. The Examiner also states that claims 5 and 20 are directed to encoding digital video using a quantizer value calculated as the sum of a base quantizer value and quantizer adjustment. Therefore, Applicants assume that the Examiner has rejected claim 20 using the same grounds of rejection as claim 5. Accordingly, Applicants  
10       respectfully submit that claim 20 is patentable over Saunders, Chiang, and their combination for the same reasons as claim 5. Specifically, Applicants respectfully submit that Saunders, Chiang, or their combination do not disclose, teach, or even suggest a computer program for quantizing digital video information that (1) determines a base quantizer value, (2) determines a quantizer adjustment based upon frame properties, and (3) computes a quantizer value as a sum of the base  
15       quantizer value and the quantizer adjustment.

          In view of the foregoing remarks, Applicants respectfully submit that the cited references do not render claim 20 unpatentable. As claims 21-28 and 36 are dependent on claim 20, Applicants respectfully submit that claims 21-28 and 36 are patentable over Chiang for at least the reasons that were discussed above for claim 20. In view of the foregoing, Applicants  
20       respectfully request reconsideration and withdrawal of the rejections of claims 20-28 and 36.

#### **XI.    Claims 29-31**

          In the Office Action, the Examiner rejected claims 29-31 under §102 (b) as being anticipated by Chiang. Claims 30-31 are directly or indirectly dependent on claim 29.

Claim 29 recites a computer readable medium that stores a computer program which is executable by at least one processor. The computer program can determine a quantizer value for quantizing digital information. The computer program includes sets of instructions for determining a delta value that includes a difference between a number of bits actually used and a number of bits that should have been used. The number of bits that should have been used is dependent upon a frame type. The computer program also has sets of instructions for quantizing the digital video information by using a quantizer value which is computed based on the delta value.

In the Office Action, the Examiner has stated that claim 29 is a software embodiment of the invention. *See*, page 12 of the Office Action. Applicants assume that the Examiner has rejected claim 29 using the same grounds of rejection as claim 14. Accordingly, Applicants respectfully submit that claim 29 is patentable over Chiang for the same reasons as claim 14. Specifically, Chiang does not disclose a computer program for determining a quantizer that determines a delta value that includes a difference between a number of bits actually used and a number of bits that should have been used where the number of bits that should have been used is dependent on a frame type.

In view of the foregoing remarks, Applicants respectfully submit that Chiang does not render claim 29 unpatentable. As claims 30 and 31 are dependent on claim 29, Applicants respectfully submit that claims 30 and 31 are patentable over Chiang for at least the reasons that were discussed above for claim 29. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejections of claims 29-31.

## CONCLUSION

In view of the foregoing, it is submitted that all pending claims, namely claims 1-36 are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.


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Respectfully submitted,

Adeli & Tollen LLP

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